Chapter 3.
General Overview

This chapter provides a general overview of **ACIS 3D Toolkit** (ACIS). It introduces the architecture of ACIS, some of the geometric modeling and ACIS concepts and terminology used throughout the documentation, and the application interfaces to ACIS. It also introduces ways to extend the modeler and the demonstration applications that illustrate ACIS functionality. Finally, it tells you what you need to know to start working with ACIS.

What is ACIS?

ACIS is an object-oriented three-dimensional (3D) geometric modeling engine from *Spatial Technology Inc.* (*Spatial*). It is designed for use as the geometry foundation within virtually any end user 3D modeling application.

ACIS is written in C++ and consists of a set of C++ classes (including data and member functions, or methods) and functions. A developer uses these classes and functions to create an end user 3D application. ACIS complements existing applications by offering a unified environment for the modeling of curves, surfaces, and solids. ACIS also supports the integration of proprietary curve and surface subsystems. ACIS provides a foundation of common modeling functionality and the flexibility to be adapted and extended for particular application requirements.

ACIS integrates wireframe, surface, and solid modeling by allowing these alternative representations to coexist naturally in a unified data structure, which is implemented in a hierarchy of C++ classes. ACIS bodies can have any of these forms or combinations of them. Linear and quadric geometry is represented analytically, and non-uniform rational B-splines (*NURBS*) represent free-form geometry.

In addition to manifold geometry, ACIS can represent nonmanifold geometry. Geometry can be bounded, unbounded, or semi-bounded, allowing for complete and incomplete bodies. A solid can have faces missing and existing faces can have missing edges. Solids can also have internal faces that divide the solid into cells.

ACIS is a boundary-representation (*B-rep*) modeler, which means that it defines the boundary between solid material and empty space. This boundary is made from a closed set of surfaces.